

REMARKS

Claims 1-21 are now in the application. By this Amendment, claims 1, 3, and 6 have been amended. Support for the amendments to independent claims 1 and 6 is found at least at page 6, lines 8-9 and at page 10, lines 19-21, of the specification. Claim 21 has been added. Support for claim 21 is found at least at original claim 3. No new matter has been added.

Claims 1 and 6 are rejected under 35 USC §112, first paragraph, because the claim recitation controlling the cell current by automation at the point of cell's resonance energy to produce a strictly controlled electric field in the cell, as recited in claim 1, and as similarly recited in claim 6, not to be enabled.

The amendments to claims 1 and 6 herein obviate this rejection.

Claims 1, 3-8, and 10-20 are rejected under 35 USC §103(a) as being unpatentable over US Patent No. 4,872,959 to Herbst et al. in view of US Patent No. 5,022,974 to Häivälä.

Claims 1, as amended, recites feeding the mass flow from the cell to a separation tower (30) of a flock and purified water and allowing the hydrogen gas to raise the flock in the separation tower (30). Claim 6, as amended, recites a separation tower (30) of a flock and purified water for allowing the hydrogen gas to raise the flock in the separation tower (30). At least these features of the independent claims cannot reasonably be considered to be suggested by the applied citations.

Herbst suggests, at col. 7, lines 44-46 and 52, an electrocoagulation process, which is different from electroflotation. In electrocoagulation "the solids in the treated solution is separated from the liquid with a filter or by retaining it for a period of time in a settling tank or basin 38." At col. 8, lines 14-18, Herbst suggests that a nickel solution is treated to form a supernatant solution having a nickel concentration of 1.47 mg/l and a sludge or precipitate containing 3.1% by nickel on a dry weight basis. Therefore, Herbst fails to suggest a separation tower of a flock and purified water, which is used in the instant electroflotation process for

allowing the hydrogen gas to raise the flock in the separation tower. Instead, Herbst suggest an electrocoagulation process in which contaminants are removed in the form of a precipitate.

Moreover, Herbst suggests, at Fig. 1, extending the contact area between the solution and the walls of the electrodes by providing a helical flow path, while in the present invention the reactions take place inside the solution within a very short cell space.

Further, Herbst suggests, at col. 7, lines 47-50, cleaning by periodically reversing the polarity, which takes place during normal operation. At page 3, the Office Action asserts that electrodes 17 and 23 in Fig. 1 of Herbst have different negativities for separation to occur. Herbst suggests, for example at col. 7, lines 1-19, that center rod 3 and outer tube 23 are preferable aluminum and inner tube 17 is preferable iron. At col. 8, Herbst suggests that the center rod and the outer one tube serve as a cathode and the inner tube serves as the anode. This indicates that Herbst fails to appraise the skilled artisan that the less electronegative electrode should serve as an anode because Herbst suggests that center rod 3 be made from aluminum and serve as cathode.

As appreciated by the Examiner, Herbst cannot reasonably be considered to suggest features corresponding to “feeding flush water intermittently through the inner electrode pipe by pressure for producing flush water sprays through the holes against inner surface of the outer electrode pipe,” as recited in claim 1 or to “flushing means (16-20) for feeding flush water intermittently through the inner electrode pipe by pressure for producing flush water sprays through the holes (4) against inner surface of the outer electrode pipe (2),” as recited in claim 6.

However, the Office Action asserts that the medium flowing through holes 5 into the reaction area 3 suggested at Figs. 1 and 2 of Häivälä can reasonably be considered to correspond to the above-quoted features of claims 1 and 6.

Häivälä suggests, at col. 2, lines 25-30, that the flow of the medium creates turbulences, which contribute to a better mixing of the components within the reaction area. Thus, Häivälä fails to suggest that the turbulences are created intermittently for cleaning purposes.

Accordingly, if a skilled artisan were to combine Herbst and Häivälä, the resulting apparatus would provide for a constant circulation of the wastewater to be treated during the electrocoagulation process of Herbst. However, the injection of the medium into the flock of an electroflotation process destroys the ability of hydrogen to raise the flock because the turbulences break up the flock and releases hydrogen that may initially have caused the flock to be raised.

Claim 2 is rejected under 35 USC §103(a) as being unpatentable over Herbst in view of Häivälä and in further view of the enclosed citation “Fe(0)-Supported Autotrophic Denitrification,” Environ. Sci. Technol. 1998, 32, 634-639, to Till et al.

The Office Action considers the stoichiometric reduction of nitrate by Fe(0) suggested in Till to correspond to a denitrification wherein nitrogen escapes from waste water in the form of nitrogen gas. Till is not applied in a manner to cure the deficiencies of Herbst and Häivälä discussed above.

Claim 9 is rejected under 35 USC §103(a) as being unpatentable over Herbst in view of Häivälä and in further view of US Patent No. 5,888,359 to Suominen.

The Office Action relies on Suominen for suggesting features corresponding to a valve in an outlet duct connected to the bottom end of the electrolysis space. Suominen is not applied in a manner to cure the deficiencies of Herbst and Häivälä discussed above.

Claims 11 and 17-20 are rejected under 35 USC §103(a) as being unpatentable over Herbst in view of Häivälä and in further view of US Patent No. 3,972,800 to King.

King is relied upon for suggesting, at Figs. 1-4, features corresponding to unscrewable end caps. King is not applied in a manner to cure the deficiencies of Herbst and Häivälä discussed above.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 22-0185, under Order No. 20750-00003-US1 from which the undersigned is authorized to draw.

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Respectfully submitted,

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